Zero Retries issue 0221 2025-09-26

Zero Retries is an independent newsletter promoting technological innovation in and adjacent to Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fifth year of publication, with 3200+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Email - editor@zeroretries.net

On the web: https://www.zeroretries.org/p/zero-retries

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Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **Merik Karman VK1DF / VK2MKZ** for *renewing* as a **Founding Member Subscriber 0007 *and* 0010** (*3rd year!*) to Zero Retries this past week!

Founding members are listed in every issue of Zero Retries!

My thanks to **Jeffrey Komori KH6JUZ** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Phil Marquis K6HSV** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Brian Webster N2KGC** for *renewing* as an **Annual Paid Subscriber** (*3rd year!*) to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 12** for *renewing* as an **Annual Paid Subscriber** (*3rd year!*) to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 52** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

Weekends Are For Amateur Radio!

Glimmers of hope for more N8GNJ / Zero Retries Labs time are emerging in about a month after we return home from our trek to Pacificon in San Ramon (Bay Area) California in mid-October. As you've read from many installments of Request to Send, there are many *long deferred* projects queued up.

But several things are conspiring to break the logjam, including that the 44Net VPN is now available for at least beta use for Amateur Radio connectivity, the Raspberry Pi 500 and now 500+ makes for easier dedicated computers (less hassle than old PC laptops), AREDN should be a lot more fun on 902-928 MHz, I hope to chat with the MMDVM principals at Pacificon and hope to receive news that MMDVM-TNC has proven usable for higher speed packet radio, and best of all there is now, verifiably, some activity here in Whatcom County on VARA FM / VarAC, and that's incentive to get back on the air with some enthusiasm. I also want to try my hand at at least rudimentary Hailing Channel activity, seeing if I can advertise services such as VarAC, Winlink RMS, Starlink Broadband Internet (battery backed up), and maybe (gasp!) an old school BBS that I can put online via VARA FM because it has a KISS interface that should "just work".

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities!

Steve N8GNJ

Leave a comment

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What's New at DLARC — September 2025

By Kay Savetz K6KJN
Internet Archive's Program Manager, Special Collections

It's been a busy month at Digital Library of Amateur Radio & Communications, with many new items added to the stacks in your favorite free online ham radio library.

The California Historical Radio Society recently donated a stack of VHFer newsletters, a publication that seems to be not too well-known. We scanned the 21 issues. VHFer was published in the 1960s by Parks Electronics Laboratory, focusing on "50 MC and Up". That's an old-school way of saying 50 MHz and up, so the 6m band and higher. It's filled with fascinating projects to build, including articles about moonbouce and meteor scatter. We have some issues in volume 3, and all of volumes 4 and 5. Vol. 5, No. 6, dated November 1967, is the final issue. "Primarily it was a matter of requiring more time than I could spend because of our growing medical electronics business," which apparently worked out because Parks Medical Electronics is still in business, not too far from me in Oregon. I reached out to them to find out if they had any more issues of the newsletter — but no luck. So for now, volumes 1, 2 and 3 go into the DLARC Wantlist.

From the estate of Bruce Berr, DLARC received 9 early issues of Glenn Hauser's DX Listening Digest and 24 issues of another Hauser publication, Review of International Broadcasting for shortwave listeners. DLARC was already home to thousands of issues of DX Listening Digest, but these new additions are easily the earliest entries, going back as far as 1979.

CHRS also contributed 32 issues of The Communicator, the publication of the now-defunct National Amateur Radio Association. NARA was formed early 1989 by Don Stoner W6TNS. The first issue we have is dated May 1990. According to an old issue of the RARS Exciter, the group was formed "with the specific function of promoting ham-radio to the non-ham populace, and lobbying for the creation of a 'no-code' ham license in the US. NARA cites the un-popularity of the code with today's computer oriented youth as being a significant factor affecting the growth of the ham ranks." The group was formed due to ARRL's "foot-dragging in support of a no-code license." It's hard to tell exactly how long the group lasted. It was still going in 1994: Stoner claimed about 7500 members at that time. It's unclear when the group dissolved: I couldn't find records on Washington State's Secretary of State web site. Stoner died in 1999. We have Communicator issues through July/August 1994, v4n4. Do you have issues published after that?

(Tangentially, I also learned that in 1959, Stoner is the person who suggested the name of the OSCAR satellite — Orbiting Satellite Carrying Amateur Radio.)

Another defunct group is the Texas-based West Gulf DX Club, which published a newsletter called WGDXC Bulletin. CHRS sent us bound volumes of this club's newsletter from 1956-1960. At first glance, those five volumes may not look like much, then you'll notice that each one is 200 to 300 pages. I'm glad we got them scanned when we did: some of the purple mimeographed pages are fading away.

While we're talking about Texas: DLARC added 126 issues of Bexar Wire, the newsletter of the San Antonio Radio Club. The group was founded in 1919, and is still active today.

Steve Stroh donated 87 issues of Radio Communications Monitoring Association's RCMA newsletter spanning 1978 through 1990. Radio Communications Monitoring Association was a group dedicated to scanner monitoring and related radio communications enjoyment. The RCMA Newsletter was folded into US Scanner News, and thanks to Steve we now have 10 issues of that magazine too. There's an interesting article in the February 1997 issue of Monitoring Times about the alleged *drama* that happened between those publications. It's a fun read if you want to know about the challenges of publishing radio magazines some 30 years ago.

We also scanned 455 issues — 27,000 pages! — of Experimental Wireless and The Wireless Engineer, a journal published in the United Kingdom, from 1923 through 1956. And, Electronic Technology, published in the UK in 1962. Read them all here.

A big project we're still in the middle of: Internet Archive has had pallets and pallets of vintage tech manuals in storage for years — material recovered in 2015 when a company called Manuals Plus went out of business. Long-time Zero Retries readers may recall that we scanned four pallets of radio-related material from that collection last year. (Here's the whole story.) Now we're back for more: 9 pallets (!!) of vintage tech manuals are being processed at the scanning center. You can see the latest additions here. If you check back again tomorrow, you're likely to see dozens more — the work gets done fast. You'll notice that the manuals don't have titles or manufacturers set at first. I come around and do them in batches. You can limit the view to titled manuals with this link. The collection includes both radio-related and non-radio-related material. Later, I'll move the radio-related manuals into DLARC. We could use your help paying for this particularly expensive, expansive project: make a tax-deductible donation to Internet Archive with this special link.

Finally: this month I visited the Spark Museum of Electrical Invention in Bellingham, Washington. I enjoyed the museum immensely. I learned about Giuseppe Zamboni: the poor guy genuinely thought he had invented a perpetual motion machine. What he had actually built was a kind of battery that ran for a long time. When he died, it was still running, so it was perpetual as far as he knew. But the real purpose of my visit to the museum was to explore the stacks of printed material the museum no longer needed. I ended up with 7 50-pound boxes of newsletters and magazines, which are now at the Internet Archive's scanning center to be digitized. I'll let you know when that material is online for you to enjoy.

Finally finally: If you're around the California Bay Area, please come to the Internet Archive's October events! On October 21, go behind the scenes at the Physical Archive in Richmond, California to see the lifecycle of books, records, and film from donation to digitization. On October 22 at IA's San Francisco headquarters: our annual celebration, marking 1 trillion webpages preserved in the Wayback Machine. There will be talks, performances, and a party full of interesting people including me. Learn more and register for these events here.

Digital Library of Amateur Radio & Communications is funded by a generous grant from Amateur Radio Digital Communications (ARDC) to create a free digital library for the radio community, researchers, educators, and students. If you have questions about the project or material to contribute, contact me at kay@archive.org.

DLARC want list: https://archive.org/details/dlarc-wantlist

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Voice over Packet (VoP)

Don Rotolo N2IRZ

We've all heard about Voice over IP, and things like the M17 Project, but I think we're one of the first to use a plain-old AX.25 packet network to send near-real-time voice over radio links.

As our TARPN network here in Atlanta grows, we find that the Chat system (part of the G8BPQ system) is a great way for all of us to keep in touch. We typically use the TARPN Home application as the user interface and, if one runs it on a tablet or other device equipped with speech-to-text (like an iPad), it's easy to simply speak your message into the system, which transports it as text to the recipients.

Doing that got me thinking: There surely is a way for an application to turn the text back into speech? Using this, can we actually deliver Voice over Packet (VoP), the ultimate in low-bandwidth voice communications? It turns out that not only is there a way (several in fact) but implementing it on a TARPN node is almost trivial. For me, the hardest part was connecting a speaker to the Pi 4B's audio output jack. Yes, that easy.

To make this work, I installed espeak-ng, configured the Pi for audio out on the 3.5 mm jack, and added some code to read and parse the incoming chat text and pipe it to the espeak-ng system. I picked espeak-ng because it is fairly compact, has reasonable audio quality, and was able to run happily in the Linux Bullseye environment I use for my TARPN node.

The small (under 50 lines without comments) Python program I developed to send the chat text to espeak-ng was written by ChatGPT with minimal but careful prompting. If anyone wants a copy or more details, my contact info on QRZ.net is valid.

I'd be interested in hearing from anyone if this has been done elsewhere, because it strains credulity to think that I was the first to do it.

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The Software Based Future of Amateur Radio

This is one in a series of personal projections of what I imagine for Amateur Radio based my participation with the recently GNU Radio Conference 2025 and Zero Retries Digital Conference 2025.

Popular Electronics January 1975 cover (edited)

I don't want to go into "*OK, Boomer…*" mode, but one of the benefits of being "long mature" (I don't feel *old*, at least mentally) is that with enough life experience, you can sometimes see familiar patterns (re)emerge. In Amateur Radio (and radio technology in general) I've begun seeing a pattern that is familiar to me - the ascent of the dominance of software on commodity computing hardware. I lived the evolution of microcomputers from the rise of the first reasonably functional personal computer - the MITS Altair shown above (have the magazine, but not one of the computers - yet) and watched as software eventually dominated over computing hardware.

That pattern is beginning to (re)apply to the ascendance of *Software Defined* Radio technology over "hardware defined radio technology".

Yes, I've told this story several times already, that Amateur Radio will inevitably be dominated by Software Defined Radio technology. Because of that inevitability, I will return to this theme in future issues. My tack for telling *this* version is that the pattern I saw play out was that once computing hardware reached a certain level of capability, computing hardware became almost commodity; software quickly became more important than the computing hardware. The only distinguishing characteristic of computing hardware was that improved hardware variations could run software faster and more capably - higher clock speeds, more RAM, 64 bits, etc.

In this story, although it's not yet obvious to the majority of Amateur Radio Operators that we're now in the Software Defined Radio (SDR) era (most HF radios still resemble radios similar to the 1950s with a multitude of manual controls, handheld and mobile radios are still mostly just setting channel plus volume)…

*we **really** are*.

Another analogy from the history of microcomputers is the achievement of the commodity operating system. Originally CP/M, then MS-DOS, then Windows and eventually Linux, with parallel evolution of UNIX into (eventually) open source BSD. This allowed application developers to focus on their applications, without much thought to the lowest level details of commoditized (computer) hardware.

For SDR, that commodity operating system is GNU Radio. With GNU Radio, developers of radio applications don't have to worry about the lowest level details of commoditized (radio) hardware.

In the microcomputer industry, there were, and still are lucrative profits for those that can push the boundaries of better computer hardware performance while still retaining compatibility with the large base of software. Better computer hardware performance enables more capable software. Witness the rise of NVIDEA to enable Artificial Intelligence applications, and the rise of ARM processors at the expense of Intel processors.

The same will be true for SDR hardware in Amateur Radio. We're not at such a point yet - SDRs haven't yet reached such a threshold for Amateur Radio usage, mostly due to low transmit power levels, especially for use above 30 MHz.

Thus there are lucrative profits waiting for someone who is able to offer commodity SDR capability mated with a power amplifier that meet Amateur Radio expectations - at commodity prices. For example, used Kenwood TM-D710GA radios are often being sold for > $500 and that is a *fixed function radio* with a basic display.

Thus when someone is able to offer a SD transceiver (arguably more capable and interesting than a TM-D710GA) for 144-148 MHz and 440-450 MHz

that offers power levels of up to 50 watts, for approximately $500, they it's my guess that they will find an eager market.

What doesn't quite match up in my parallel evolution of microcomputer applications and SDR applications is the profit motive. It was easy, and lucrative, to sell proprietary software for microcomputers.

To date, anything developed on GNU Radio isn't (directly) profitable as the license for GNU Radio incorporates "Copyleft" which requires anything that incorporates GNU Radio to redistribute the changed code freely.1

That will supposedly change with GNU Radio 4.0 - no more copyleft. If you want to use what is contributed into GNU Radio 4.0 as the basis for your project and prefer not to (for whatever reason) not contribute your changes / improvements back into GNU Radio 4.0, you aren't compelled to do so.

Arguably, that's a good thing. Technological evolution can take great leaps when there's a profit motive, even in Amateur Radio. One example is that wouldn't have known that it was possible to run an app on a commodity Windows PC that could achieve up to 25 kbps on a 12.5 kHz channel if Jose Alberto Nieto Ros EA5HVK had not created VARA FM as a proprietary application.

Whatever you think of D-Star and System Fusion, those (widely perceived as proprietary) features sold a lot of radios for Icom (and recently, Kenwood) and Yaesu, respectively.

Thus, with my "hindsight", I will be looking for someone… some small, hungry tech company to come out with a combined Software Defined Transceiver and VHF / UHF power amplifier for (purely imaginary price target) $500 in the next year. The market (especially beyond Amateur Radio) for such a unit is just getting too hot for such a product not to emerge2. Initially targeting Amateur Radio for such a product is easy and inexpensive because with a minimum of promotion and marketing, Amateur Radio Operators, and especially NewTechHams, will see the value and vote for such innovation with their wallets.

We'll probably see the LinHT emerge first; it's almost too easy to create by a major radio manufacturer for it not to happen… and soon.

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Polar Modulation - It's a Big Deal

A Zero Retries reader shared with me an excerpt from a magazine - I'll guess it's from RSGB's 2025-09 issue of RadCom magazine, titled **Polar modulation goes mainstream**. My correspondent said:

> I don't know if people understand how much of a big deal it really is.
>
> Crickets about this in QST.
>
> K1KP showed his proof of concept at Dayton in 2019 and Flex brought him on shortly after to develop the Aurora.

Indeed - see https://www.polex-tech.com which says in part:

> **Update!**
>
> I'm pleased to announce that Polar Explorer technology has been integrated into the latest FlexRadio product, the Aurora series radios. This is the result of a 6-year collaboration with FlexRadio to develop the product, and explains why this website has not been updated since 2019. Development of the Polar Explorer as a standalone transmitter was discontinued when work on Aurora began.

I love reading stories like this where proving out a good idea (Polar Explorer) leads to a bigger company seeing a good idea that they (with their greater resources) can *cooperatively* develop into a system that can scale to widespread adoption of the new technology (FlexRadio Aurora). Kudos to K1KP and FlexRadio!

The thrust of the cited article is that while Polar Modulation ultimately results in a Single Sideband (SSB) signal same as conventional SSB radios, how SSB is developed at higher power levels using Polar Modulation is fundamentally different, and much more exacting, than conventional radios. In essence, Polar Modulation modulates the power amplifier, not the (low power) exciter… and that's tough… but now doable with current technology (and, as FlexRadio attests in its six year development of Aurora, lots of development work).

Speaking of Polar Modulation and FlexRadio Aurora, although I cannot link to it, the **September 2025 issue of FlexRadio Insider** newsletter, authored by FlexRadio CTO & Aurora Program Manager Steve Hicks N5AC, had this interesting bit to say about the final development stages of FlexRadio Aurora:

> **Safety Testing: A Higher Bar**
>
> We're still deep in the safety testing phase. Because Aurora integrates **three AC-to-DC power supplies**, operates at **high internal voltages**, and produces **500W of RF output**, the safety validation requirements are far more involved than with any previous FlexRadio product. While this is taking longer than we initially anticipated, the good news is that progress is steady—and every step brings us closer to certification with confidence.

He has a point - 500 watts of HF RF power in a small form factor would have a higher bar for safety. I remember when I accidentally touched a wire antenna radiating HF at 100 watts…. *not fun*.

(CentyLab) PocketPD is now live on CrowdSupply!

Email from CentyLab:

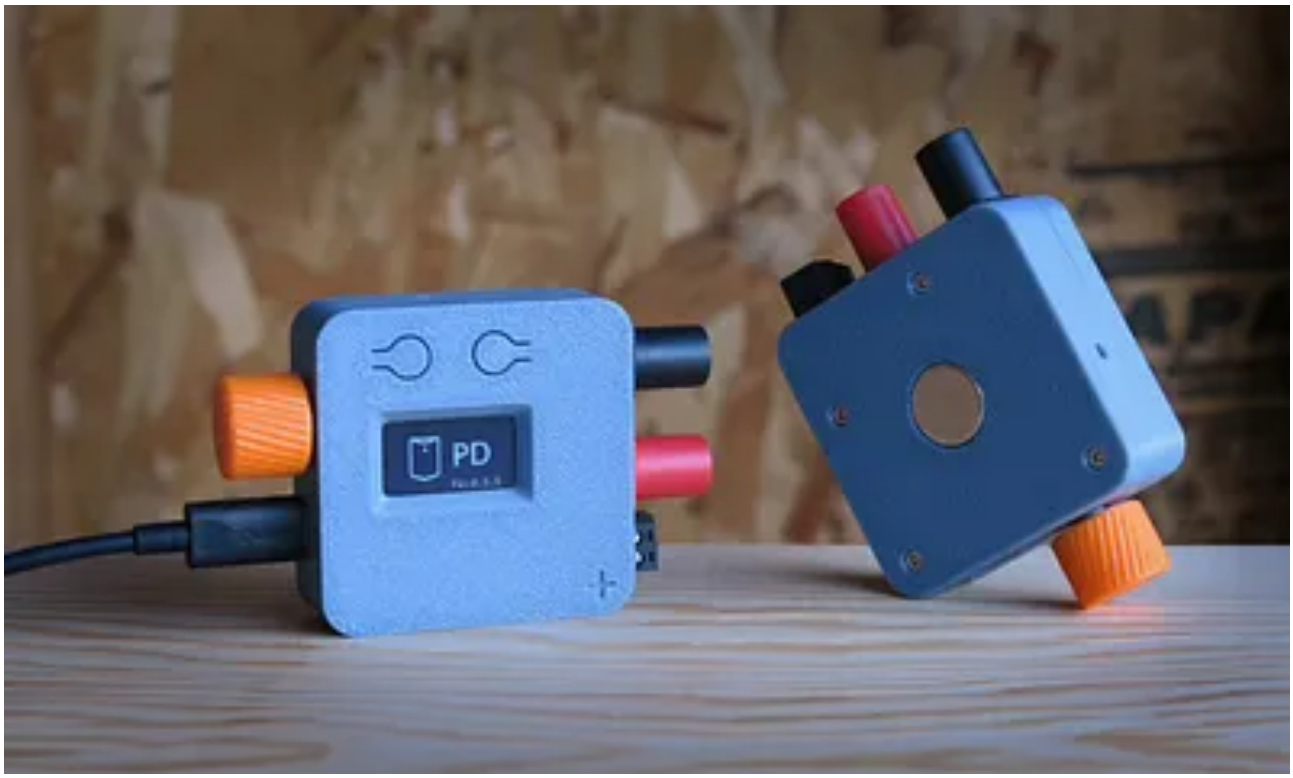
Hi from CentyLab,

We are happy to announce that we are officially launched on CrowdSupply - PocketPD. Check us out!

Image courtesy of CentyLab

Always hungry for more power? Meet PocketPD, a portable bench power supply that delivers reliable, adjustable power from your [USB C] charger or power bank. PocketPD fits in your back pocket, weighs only 63 g, and provides…

- Up to 5 A with finely adjustable voltage from 3.3 to 20 V
- Standard short-circuit, reverse-current, and flyback-diode protections
- Open source firmware, schematic, and 3D case model
- A magnetic back for mounting that also helps keep the unit cool



From the CentyLab website:

> We are a two-person team with a mix of hardware, software, firmware, and mechanical design skills. We are passionate about bringing more capability to USB Type-C starting with Power Delivery.

(I think…) Vincent Ng and Louis Law of CentyLab did their first public display of PocketPD at ZRDC 2025, and donated two of them to ZRDC attendees as door prizes. *It is cool to see them launch on Crowd Supply*. I think I'm going to have to join this crowdfunding campaign - $70 plus shipping.

Rhizomatica at Hamvention 2025

ARDC blog:

> Below is a guest contribution from Peter Bloom, General Coordinator of ARDC grantee Rhizomatica. If you're a grantee and are interested in submitting a guest contribution, please reach out to giving@ardc.net.
>
> Our organization, Rhizomatica, is a non-profit organization supporting worldwide community communications infrastructure in hard-to-reach areas like the Ecuadorian and Brazilian Amazon, Central African Republic, and Bangladesh. Though based outside of the US, back in May, two of us – myself and HERMES Project Lead Rafael Diniz PU2UIT – traveled to Xenia, OH, to attend Hamvention. The purpose of this trip was to build bridges with the ham community around a Rhizomatica-developed technology called HERMES, an open-source system used by some hams to do digital communications over HF radio. We aimed to raise awareness of our project and allow attendees to learn more about it.
>
> …
>
> Many people who had heard of us stopped by the booth, and we had the chance to do deep dives with them on the software we have been developing as part of HERMES and the larger technology and policy ecosystem for digital access and connectivity. Since so much of the ham world is present at Hamvention, we had longer interactions as well with SDR-based HF transceiver companies to explore how to get our software running on their radios. One of these companies was our current hardware/radio supplier, HF Signals, based out of India. We discussed needed changes to their open-source hardware to make it more accessible for the people Rhizomatica serves, such as upgrading their hardware to run digital voice software from FreeDV, another open-source project operating in the space.

There was this one interesting link at the very end of the article:

https://hermes.radio

> **WHAT´S UNDER THE HOOD?**
> Due to its low power usage and small size, HERMES can be installed in both mobile and fixed remote monitoring settings, such as boats or weather stations, to send real-time GPS coordinates, photos and sensor data.
>
> **REMOTE MONITORING**
> Together with social organizations and remote communities, first in the Amazon rainforest, and then around the world, we have been dreaming about, designing, building and testing HERMES since 2017 to create reliable, secure, long-range, autonomous voice and digital communications.

WHY WE BUILT HERMES?
Powered by HF radio, HERMES enables voice and data communication over vast distances (hundreds of kilometers) with very low power consumption and without the need for Internet or satellites. It can be installed practically anywhere.

LONG-DISTANCE COMMUNICATIONS ALL OPEN SOURCE !CONTACT US
As an option, HERMES uses state of the art encryption and password protection to keep communications safe from prying eyes and ears.HERMES is compatible with HAM radio regulations as all security features are optional and software-configurable.

SECURE COMMUNICATIONS

- Software Defined Radio (SDR) with 25 Watts of output power on 80 M to 10 M bands
- SSB digital voice radio with PTT microphone
- Compute and interface via Raspberry Pi 4/5 with a 7-inch touch screen
- Powered with 12VDC. Power consumption in receive: 600 mA, transmit: 9A
- Measures 25cm x 15cm x 5cm and weighs about 2Kgs. About the size of a hardcover book.

WHAT'S IN THE BOX?

- Mercury - Rhizomatica's software-defined digital modem for HF. Also Vara compliant.
- Full email system and app-based chat that route globally.
- Public messages and secure, password-protected image, voice, text and file exchange between stations.
- Intuitive web interface for operation and administration
- Dual mode for simultaneous voice and data transmission
- Both our software and the radio hardware platform are completely open source. Software and documentation available at HERMES WIKI

I knew that this was a goal… I didn't realize that they were so far along in integrating their software with a HF Signals radio, and cool that they're talking to HF Signals about a built-for-purpose version of the HF Signals sBitx. Impressive accomplishment, and one reason why HF bands shouldn't be given over entirely to commercial datacasting - there are still ample, important uses for HF spectrum beyond government and Amateur Radio. I really like that Rhizomatica is their matter-of-fact about encryption with the potential for Hermes Radio to be used on Amateur Radio: *Don't want / need / allow encryption? Just turn it off.*

A Deep Dive into the Digital Data Function of the Icom IC-9700

I normally don't mention paywalled articles, but Zero Retries Pseudostaffer Jeff Davis KE9V pointed this article out to me that it is exactly the kind of mention suitable for Zero Retries readers, and I agree.

In the September October 2025 issue of ARRL QEX, there was an interesting article on Icom's Digital Data mode for its radios that cover 1.24 - 1.30 GHz (the ID-1, the IC-9700, and the IC-905). The authors were "Michael M." PC7MM and "Richard J." PD3RFR.

> This article explores the little-known DD mode of the Icom IC-9700, enabling 128 kbps data communication over 23 cm. A performance analysis and a remotely operated radio demo reveal its strengths, limitations, and potential for further advanced experimentation.

I appreciate the authors' research that discussed that typical Ethernet (computers) want to send all manner of traffic on an Ethernet connection… because, why not, given the ample bandwidth of Ethernet? But such extraneous traffic completely saturates a limited connection like DD mode, so all extraneous Ethernet traffic has to be filtered out (the Icom radios have no such filter / firewall) - they operate as a very simple Ethernet bridge - Ethernet data in, radio data out). That information will come in handy when I finally get my Icom ID-1s online for inter-lab communications in N8GNJ / Zero Retries Labs.

But I also had some minor frustrations after reading the article that the authors apparently lack much historical context of the Icom DD mode, that it was developed more than two decades ago now for the discontinued ID-1. At the time, data communications networking was a rising interest in Amateur Radio and Icom's DD mode was one of the very few data communications systems for Amateur Radio by a major manufacturer. For example, Icom still offers a 1.24 - 1.30 GHz repeater suitable for DD mode.

The authors attempted to use DD mode for Voice Over Internet Protocol (VOIP) communications which require very short packets and very short latency - suitable for typical (full duplex) Internet connections but not a half-duplex radio like the IC-9700. I think if the authors had attempted a file transfer, they would have been more impressed with DD mode, especially in comparison to other forms of data communications available within Amateur Radio (that aren't repurposed Wi-Fi or Wireless Internet Service Provider equipment such as AREDN).

Connect Systems CS-7000 M17 Radios - M17 Experimental Firmware Release

Email from Connect Systems:

> One of the developers of the firmware for M17 has just released a new version for testing. Please read his letter to me below to see what it is about. Please contact him at silseva@fastwebnet.it for comments or questions.
>
> The version for the CS7000 M17 GPS and CS7000 M17 PLUS is on our website at the following address. It is at the bottom of the page. The version for the CS7000 M17 will be there soon.
>
> https://www.connectsystems.com/amateur-software/CS7000_m17_plus_software.html

> Hi Jerry,
>
> I'm sending you an experimental firmware for both the CS7000 and CS7000-PLUS with an implementation of a noise gate for M17, addressing the "frying pan" effect reported by many users.
>
> The noise gate works by computing the envelope of the energy of the incoming speech samples and, if this greater than -40dB it sends the samples to the codec2 encoder. On the other hand, if the envelope is lower than the threshold the codec receives pure silence, that is a block full of zeroes. Please note that the noise gate is on the TX side, while the incoming audio is still received and demodulated as is: this means that if the remote end is not using the noise gate, the user will still get the noisy audio. I chose to add the noise gate only on the TX side because this will increase the audio quality irrespectively of the method used to receive and demodulate the M17 audio stream.
>
> I already had some people testing it and reporting good results, but I'd like to have a review from a wider user base before bringing the code into mainline.
>
> Best regards,
>
> Silvano Seva

LinHT – First GRF5604 RF Amplifier Tests

Wojciech Kaczmarski SP5WWP on M17 Project:

> GRF5604 test boards finally arrived. I tested one of them using an HP E4436B RF signal generator. The datasheet mentions gain value of 37.5dB at 460MHz and 5V supply, so I used 0dBm signal to find out if we can get anywhere close to the reference value.
>
> …
>
> The "step" effect at the sides of the TETRA signal will hopefully be mitigated by applying digital predistortion at GNU Radio level. Here's a sample 2nd order polynomial DPD block for GNU Radio. There's a good chance that the device will be able to apply predistortion in real-time, based on the measured output signal (feedback loop). A similar approach could be possibly used for IQ imbalance and DC offset correction.

Great progress!

Raspberry Pi 500+ - The Evolved Raspberry Pi 500

In my mind, the big news of the US$200 Raspberry Pi 500+ this week isn't the sexy mechanical keyboard or the keyboard backlighting (although, that is kind of cool…), or even that the keycaps can be replaced for something… sexier (I guess…). For me, the big news about the Raspberry Pi 500+ is that Raspberry Pi has *almost* finished the job of the very usable, capable, computer-in-a-keyboard form factor.

One of the nicest things about the RPi 500 / 500+ is that there are no moving parts. Unlike the RPi 5, which requires a fan (or a very large metal heatsink assembly), the RPi 500 / 500+ has an integral, internal large aluminum heatsink so a (noisy, failure prone) fan isn't necessary.

There's no change in the raw compute capabilities over the Raspberry Pi 500; the big news (to me) is that the Raspberry Pi 500+ increases the RAM to a much more usable 16 GB and the default storage is now 256 GB… on a *Solid State Drive (SSD)* rather than a Micro SD card that was the only internal option for storage on the Raspberry Pi 500. The 256 GB SSD is standard on the Raspberry Pi 500+, *but it's replaceable*, and apparently Raspberry Pi expects you to do so as they finally make it easy to open the case with a cutout to pry the two halves apart.

The last "missing piece" of the Raspberry Pi 500+ is that there's no option (yet) for using Power Over Ethernet (POE)… which would really be nice. If that were to be included, perhaps the power distribution is adequate that you could power the Raspberry Pi Monitor from the RPi 500+ USB connections so you only needed a single cable connection for networking and power.

And I love that Raspberry Pi has stayed true to their experimental, learning ethos by continuing to offer access to the 40 pin General Purpose Input / Output (GPIO) pins by default; they're not even hidden behind a plastic cover.

ARDC is Recruiting Volunteers for 2026 Committees

ARDC Communications Manager Rebecca Key KO4KVG via email:

> We opened applications for our 2026 volunteer committees, and we are looking for qualified individuals to serve on our existing committees:
>
> - Grants Advisory Committee (GAC): https://www.ardc.net/about/committee-volunteer-positions-at-ardc/grants-advisory-committee/
> - Technical Advisory Committee (TAC): https://www.ardc.net/about/committee-volunteer-positions-at-ardc/technical-advisory-committee/
> - Grants Evaluation Team (GET): https://www.ardc.net/about/committee-volunteer-positions-at-ardc/grants-evaluation-team/
> - Conduct Review Committee (CRC): https://www.ardc.net/about/committee-volunteer-positions-at-ardc/conduct-review-committee/
>
> In addition to the above committees, we also have two new volunteer opportunities for 2026:
>
> - Grants Communications Team (GCT): https://www.ardc.net/about/committee-volunteer-positions-at-ardc/grants-communications-team/
> - 44Net Portal Ticket Handlers: helps to verify call signs and related information for 44Net address space requests
>
> Also, we've recently published a related blog post that provides more information about qualifications, time commitments, and the application process: https://www.ardc.net/join-ardcs-2026-volunteer-team/.

ARDC's committees are some of the hardest work you'll ever love having done in Amateur Radio. Not only do you do good work getting ARDC grant money out into Amateur Radio and related activities (such as scholarships), you develop an understanding about ARDC's operations and why "it's not really so simple to just shovel money out the door".

I was particularly delighted to learn of the new *Grants Communications Team*! The purpose of that team indicates that one of my primary… wishes… about ARDC grants, and the progress of them… has been heard and understood.

Volunteering with ARDC is highly recommended!!!

Bridgecom Systems BCR-220 Repeaters On Sale for $600 thru 2025-09-30

Amateur Radio Operators are fickle and Bridgecom seems tired of having capital (and inventory space) tied up in slow-moving products like 222-225 MHz repeaters for the Amateur Radio market. I suspect that they will blow through their entire inventory of BCR-220s with this nice sale and then exit the 222-225 MHz repeater business… this time not to be enticed back into it by promises that "Oh, I'd buy one if you still had them available".

So Bridgecom is (not so quietly) doing a blowout sale on the BCR-220 - $600. Multiple folks pointed this out to me.

If you want to do a Zero Retries Interesting experimental repeater, especially something like a SuperPeater, this is a great deal for experimentation.

The BCR-220 is built reasonably well3, and I have no qualms about recommending it.

Leave a comment

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The **Zero Retries Store** is now open for business with quality Zero Retries branded merchandise and items being retired from Steve's N8GNJ Labs.

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

See the **Zero Retries Boilerplate** page for significant acknowledgements and other information relevant to Zero Retries. For new readers of Zero Retries, that page, and the **About Zero Retries** page has useful information to check out.

My ongoing ***Thanks*** to:
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Jack Stroh, Late Night Assistant Editor Emeritus
Shreky Stroh, Late Night Assistant Editor In training

***Annual Founding Members* who generously support Zero Retries financially:**
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Founding Member 0007 *and* 0010 - Merik Karman VK1DF / VK2MKZ (Renewed 2025 x2, *3rd year!*)
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Amateur Radio, Amateur Radio Digital Communications, ARDC, Bridgecom Systems BCR-220 Repeater, **Data Communications**, **Digital Communications**, Digital Library of Amateur Radio & Communications, CentyLab, **Digital Voice**, DLARC, **DV**, FlexRadio Aurora, **Ham Radio**, hermes.radio, Icom Digital Data DD Mode, M17 Project, **N8GNJ**, **Packet Radio**, PocketPD, Polar Modulation, **Radio Technology**, Raspberry Pi 500+, Rhizomatica, **Software Defined Radio**, **Software Defined Receiver**, **Steve Stroh,** Voice over Packet, VoP, **Zero Retries, Zero Retries Digital Conference, ZRDC 2025**

*Keywords in **Bold** are regular mentions in each issue.*

Footnotes for this Issue

To see the relevant sentence for the footnote, just click the footnote number.

1

It was explained to me at GRCon 2025 is that a lot of usage of GNU Radio in commercial settings is mostly for prototyping / proof of concept. Then the lessons learned are used in developing a commercial product with no involvement (taint…) of GNU Radio.

2

In a future story about this theme, I plan to touch on some of the commercial applications for Software Defined Transceivers for commercial and other non-Amateur Radio use.

3

Yes, the Repeater Builder / "Motorola, Forever!" partisans will disagree, but if you want an off the shelf 222-225 MHz repeater, this is the *only* one.